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DEL CHRISTENSEN
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EXAMINER

PAIK, SANG YEOP

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHESTER LEDLIE SANDBERG,
HAROLD J. VINEGAR, CHRISTOPHER KELVIN HARRIS,
JAIME SANTOR SON and
FREDERICK GORDON CARL JR.

Appeal 2010-001040
Application 10/693,700
Technology Center 3700

Before LINDA E. HORNER, JOHN C. KERINS and
STEVEN D.A. McCARTHY, *Administrative Patent Judges*.

McCARTHY, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellants¹ appeal under 35 U.S.C. § 134 from the Examiner's decision finally rejecting claims 1691-94, 1696-1713, 1715-32 and 1734-49 under 35 U.S.C. § 103(a) as being unpatentable over Eastlund (US

¹ The Appellants identify the real party in interest as Shell Oil Company.

4,716,960, issued Jan. 5, 1988); either Van Egmond (US 5,065,818, issued
Nov. 19, 1991) or Bell (US 4,382,469, issued May 10, 1983); and Rose (EP
0 130 671 A2, publ. Jan. 9, 1985). The Examiner also provisionally rejects
claims 1691-94, 1696-1713, 1715-32 and 1734-49 for non-statutory
obviousness-type double patenting as being unpatentable over one or more
of claims 1691-96, 1698-1716, 1718-34 and 1736-53 of Sandberg '820 (US
Appl'n 10/693,820, filed Oct. 24, 2003, publ. Jul. 29, 2004 as US
2004/0144540 A1) and claims 1691-94, 1696-1701, 1704-18, 1720-42 and
1744-59 of Sandberg '840 (US Appl'n 10/693,840 , filed Oct. 24, 2003,
publ. Jul. 2, 2002 as US 2005/0238461). Counsel for the Appellants
presented oral argument on November 17, 2011. We have jurisdiction under
35 U.S.C. § 6(b).

We REVERSE the final rejection of claims 1691-94, 1696-1713,
1715-32 and 1734-49. We do not reach the provisional rejection of these
claims.

Claims 1691, 1710 and 1729 are independent. Claim 1691 recites:

1691. A system configured to heat a
hydrocarbon containing formation, comprising:

a heater well extending from a surface of the
earth through an overburden of the formation and
into a hydrocarbon containing layer in the
formation; and

an AC supply configured to provide AC at a
frequency between about 100 Hz and about 1000
Hz;

one or more electrical conductors located in
the heater well, at least one of the electrical
conductors extending from the surface into the
hydrocarbon containing layer, and at least one of

1 the electrical conductors being electrically coupled
2 to the AC supply;

3 at least one electrical conductor comprising
4 an electrically resistive ferromagnetic material, the
5 electrical conductor being configured to provide an
6 electrically resistive heat output during application
7 of AC to the electrical conductor, and the electrical
8 conductor being configured to provide a reduced
9 amount of heat above or near a selected
10 temperature, the selected temperature being within
11 about 50°C of the Curie temperature of the
12 ferromagnetic material; and

13 wherein the system is configured to provide
14 heat to the hydrocarbon containing formation such
15 that sufficient heat transfers from at least one of
16 the electrical conductors to hydrocarbons in the
17 hydrocarbon containing formation to at least
18 mobilize some hydrocarbons in the formation.

19 Claim 1691 and 1710 each recite a system “configured to provide heat
20 to the hydrocarbon containing formation such that sufficient heat transfers
21 from at least one of the electrical conductors to hydrocarbons in the
22 hydrocarbon containing formation to at least mobilize some hydrocarbons in
23 the formation.” The latter recitation limits the system to one which not
24 merely heats hydrocarbons which originated in the hydrocarbon containing
25 formation, but heats the hydrocarbons while the hydrocarbons are in the
26 formation. This interpretation is consistent with the disclosure of the
27 Specification.

28 On the other hand, an interpretation of the term broad enough to
29 encompass heating hydrocarbons which originated in the hydrocarbon
30 containing formation while the hydrocarbons are outside the formation
31 would be inconsistent with the recitation in the preamble of each claim of a

1 system “configured to heat a hydrocarbon containing formation.” Such an
2 interpretation also would be inconsistent with the recitation that the heating
3 is “to at least mobilize some hydrocarbons in the formation.” (*Cf.* App. Br.
4 9 (arguing that “Eastlund only teaches the heating of fluids that have
5 **already** been mobilized and have moved into the well tubing through
6 perforations 12 (Figure 1) or perforations 113 (Figure 7A).” Emphasis in
7 original.).)

8 Claim 1729 recites a method of heating a hydrocarbon containing
9 formation. The method also includes “allowing heat to transfer from the
10 electrical conductors to hydrocarbons in the hydrocarbon containing layer to
11 at least mobilize some hydrocarbons in the layer.” For reasons similar to
12 those discussed in the last paragraph of this opinion, the step is limited to
13 allowing heat to transfer from the electrical conductors to hydrocarbons
14 while the hydrocarbons are in the hydrocarbon containing layer.

15 Eastlund describes a well having an upper tubing section *13a* and a
16 lower tubing section *13b* suspended in a casing *10*. (*See* Eastlund, col. 3, ll.
17 20-24.) A lead *19* electrically connects a power source with the lower
18 tubing section *13b*. (*See* Eastlund, col. 3, ll. 64-68.) Another lead *21*
19 electrically connects the power source with a wellhead. (*See* Eastlund, col.
20 4, ll. 6-7.) The casing *10* is secured to the wellhead. (*See* Eastlund, col. 3,
21 ll. 13-15.) A “scratcher” *17* electrically connects the lower tubing section
22 *13b* and the casing *10* to complete an electrical circuit at and above the
23 scratcher *17*. (*See* Eastlund, col. 3, ll. 55-63.)

24 Eastlund teaches using an electrical circuit to heat the tubing to
25 prevent solids such as paraffin from depositing within the tubing. (*See*
26 Eastlund, col. 4, ll. 22-25). Eastlund teaches connecting the casing *10* and

1 the lower tubular section *13b* below the normal level of solids formation in
2 the tubing. (*See Eastlund*, col. 3, ll. 40 and 51-52.) Nevertheless, Figure 1
3 of *Eastlund* implies that the scratcher *17* defines the lowest extent of the
4 electrical circuit significantly above the hydrocarbon containing formation
5 as indicated by the casing perforations *12*. (*See Eastlund*, col. 3, ll. 17-19.)
6 The Examiner does not provide a sound, non-conclusory basis for finding
7 that the electrical circuit is capable of heating hydrocarbons in the
8 hydrocarbon containing formation. (*See generally* Ans. 3 and 6-8; *see also*
9 App. Br. 9-10.)

10 Van Egmond describes a heater “particularly useful in enhanced
11 recovery of heavy oils from oil bearing strata, and in recovery of
12 hydrocarbons from oil shales.” (*Van Egmond*, col. 2, ll. 6-8.) The heater
13 includes heating cables *1*, *2*. (*See Van Egmond*, col. 3, ll. 35-37.) Figure 1
14 of *Van Egmond* depicts the cables *1*, *2* as extending from the surface to heat
15 a subterranean zone *2* located below the overburden. (*See Van Egmond*, col.
16 3, ll. 32-24.)

17 Bell teaches a method for producing fuel gas from an underground
18 formation of carbonaceous material. The method includes contacting the
19 carbonaceous material with an aqueous electrolyte and passing a controlled
20 amount of direct current through the formation to produce the gas by electro-
21 chemical action. (*Bell*, col. 2, l. 54 – col. 3, l. 2.)

22 The Examiner concludes that:

23 it would have been obvious . . . to adapt *Eastlund*
24 with the heater well that extends through an
25 overburden formation and into the hydrocarbon
26 containing formation at least about 10 m or more
27 to effectively heat such hydrocarbon containing
28 layer.

1 (Ans. 4.) The problem with this conclusion is that Eastlund's electrical
2 circuit is designed to heat and mobilize hydrocarbons within the tubing
3 rather than in a hydrocarbon containing formation. The adaptation that the
4 Examiner proposes would require adapting Eastlund's circuit to address a
5 problem for which the circuit was not designed. Van Egmond and Bell
6 describe different systems for addressing different problems. The
7 Examiner's reasoning does not persuade us that the teachings of either Van
8 Egmond or Bell would have provided one of ordinary skill in the art reason
9 to try to adapt an electrical circuit such as that described by Eastlund to heat
10 hydrocarbons in a hydrocarbon containing formation. (*See App. Br. 11-12.*)

11 The Examiner correctly finds that Rose describes "a heating element
12 having an inner core made of copper with an outer conductor made of a
13 resistive ferromagnetic carbon steel which allows the heating element to be
14 self-regulating." (Ans. 4; *see also* Rose 9, ll. 1-18.) Rose does not appear to
15 suggest use of the heater for heating hydrocarbons in a hydrocarbon
16 containing formation. Rose does not remedy the deficiencies in the
17 combined teachings of Eastlund with Van Egmond or Bell. We do not
18 sustain the rejection of claims 1691-94, 1696-1713, 1715-32 and 1734-49
19 under § 103(a) as being unpatentable over Eastlund; Van Egmond or Bell;
20 and Rose.

21 The Examiner also provisionally rejects appealed claims 1691-94,
22 1696-1713, 1715-32 and 1734-49 for non-statutory obviousness-type double
23 patenting as being unpatentable over one or more of claims 1691-96, 1698-
24 1716, 1718-34 and 1736-53 of Sandberg '820 and over one or more of
25 claims 1691-94, 1696-1701, 1704-18, 1720-42 and 1744-59 of Sandberg
26 '840. The Appellants do not contest this rejection. Instead, the Appellants

1 represent that they will provide a terminal disclaimer once the application
2 underlying this appeal is in condition for allowance. (*See App. Br. 24.*)
3 Based on this representation, we do not reach the provisional rejection.
4 Nevertheless, we note that Sandberg '820 and Sandberg '840 appear to have
5 the same filing date as the application underlying this appeal. We direct the
6 Examiner's attention to the second paragraph of § 804 I.B.1. of the MANUAL
7 OF PATENT EXAMINING PROCEDURE.

8
9 DECISION

10 We REVERSE the Examiner's decision finally rejecting claims 1691-
11 94, 1696-1713, 1715-32 and 1734-49.

12 We do not reach the Examiner's decision provisionally rejecting
13 claims 1691-94, 1696-1713, 1715-32 and 1734-49.

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15 REVERSED

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19 Klh